"Dedicated to Public Service"

THE RADIATOR

Golden Empire Amateur Radio Society, Inc.

Chico

SPECIAL SERVICE CLUB

W6RHC
IRLP #8170

www.gearsw6rhc.org

P.O.Box 202 Chico, CA 95927

September 2020 Newsletter	GEARS Founded August 13, 1939

The FCC is proposing increasing fees to $50 for new license and license renewel. Please consider writing the FCC as well as our Senators and Congressman opposing this. See ARRL for more information: arrl.org/news

Long time GEARS member and current board member Rick Hubbard is moving to Illinois to be closer with family. We will miss him.

A 50' tower is for sale in Chico, it's a sectional tower already disassembled ready to pick up. Call Gordon 530-345-5418.

Our VECs held two testing sessions last month, We have a total ten new ham operators now. Tom Rider will continue to offer tests as needed at an outside location, call him at 514-9211 for information.

We will be making some improvments in the Tuesday GEARS net. Please try to join us if you can.

We will hold the September GEARS and board meeting online by Zoom. Watch your email for a link and phone number. We look forward to face to face meetings again when it's safe to do so.

It's not too early to think of new officers for GEARS next year. If you would like to server as an officer or on our Board of Directors, please let me know.

Please try to participate in the local nets, at least we can get together by radio.

'73
Jim Matthews K6EST
jiminchico@yahoo.com
530-893-3314

Join GEARS on Facebook
www.facebook.com For timely news and additional information.

September 2020 Calendar

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1 7:30pm GEARS Net	2	3 7pm PARS Net 7:30pm Simplex Net	4	5
6 8pm OARS Net	7 7pm GARS Net 8pm ARES Net	8 7:30pm GEARS Net	9	10 7pm PARS Net 7:30pm Simplex Net	11 7pm GARS & OARS Meetings	12 GEARS Board Meeting online
13 8pm OARS Net	14 7pm GARS Net 8pm ARES Net	15 7:30pm GEARS Net	16	17 7pm PARS Net 7:30pm Simplex Net	18 7pm GEARS Meeting online	19
20 8pm OARS Net	21 7pm GARS Net 8pm ARES Net	22 7pm ARES meeting 7:30pm GEARS Net	23	24 7pm PARS Net 7:30pm Simplex Net	25	26 9am OARS Breakfast
27 8pm OARS Net	28 7pm GARS Net 8pm ARES Net	29 7:30pm GEARS Net	30			

VEC Testing, FCC License Exam available by appointment. For information or registration call Tom Rider, W6JS 514-9211
Chico Breakfast Cancelled until things settle down with the COVID-19 virus.
GEARS Board Meeting 2nd Saturday online.
OARS Meeting Second Friday of the month, TBD (To Be Determined)
GARS Meeting Second Friday of the month, TBD
Butte ARES Meeting 3rd Tuesday, TBD Contact Dale Anderson, KK6EVX 826-3461 for more information.
GEARS Meeting, third Friday of the month, online till further notice pm, meeting at 7:00 pm.
OARS Breakfast 4th Saturday of the month TBD

NETS:
OARS Club Net Sunday 8pm 146.655 Mhz - PL 136.5
GARS Club Net:Monday,7:00 pm 147.105 MHz + PL 110.09
Butte ARES Net Mondays 8pm 145.290 MHz - PL 110.9
Yuba Sutter Club Net Monday 7pm 146.085 MHz + PL 127.3
GEARS Club Net Tuesdays 7:30 PM 146.850 MHz - PL 110.9
PARS Club Net Thursday 7pm 145.290 - PL 110.9
Simplex Net Thursday 7:30 p.m. 146.52 no tone
Yuba Sutter ARES Net Thursdays 7pm 146.085 MHz + PL 127.3
Sacramento Valley Traffic Net Nightly 9:00 PM 146.850 MHz - PL 110.9

Mt. St. John

Our new repeater on Mt. St. John is now working much better.

Michael Favor N6FAV and Mike Mike Ellithorp KF6OBI worked on the mountain. They replaced the feedline and also set the tone on the repeater output. Activate the CTSS on your radios and give the repeater a try.

You should be able to work the repeater in the valley from a handheld radio.

145.410 Mhz PL is 123.0 Negative offset.

So You Still Have Your License but Haven't Operated in Years: A Guide to Getting Back into the Hobby
By Anthony Luscre, K8ZT

Last week we discussed VHF, this month I'll cover HF. Please dig out that old club roster, find the Hams who have not been active, and email them this article. If you don't have an email address for them, print out a copy, and mail it to them. You might just make an old friend's day and reawaken a dormant Ham.

To the inactive Hams out there, I would like to welcome you back on the air. It's time to dust the cobwebs off that old equipment or acquire new gear to replace what you sold or gave away. Much about the hobby is still the same, but a few things have changed thanks to computerization, online activities, and other advances in the world of telecommunications.

A returning Ham will find many familiar signals and types of operation on the HF bands. You'll also find major changes, including these:

New Amateur Radio bands: Depending on how long you have been off the air, the so-called WARC bands, on 30, 17, and 12M, might be new to you. Same goes for allocations at 60M (5.3 MHz), 2,200 meters (135 kHz), and 630M (472 kHz). For the complete rundown of all Amateur Radio allocations, visit the ARRL Graphical Frequency Allocations page.

New modes by the dozens: Often called Digital Sound Card Modes (DSCM), many new modes have been developed for HF bands. These include PSK, PACTOR, CLOVER, HELLSCHREIBER, JT65, and more. These modes require a computer to both modulate and demodulate the signals on the radio.

Two of these modes have become dominant. FT8 and FT4, part of the WSJT-X suite, are giving CW and SSB a run for many Ham's total on-air time. The big advantage of these modes is the ability to make contacts with very weak signal levels. This means that bands that seem dead can now support contacts. Hams with suboptimal antennas, such as those facing homeowner restrictions or other impediments, still have an opportunity to make contacts on HF bands.

With CW proficiency no longer required to get your license, you might think that Morse code transmissions have dwindled to a mere trickle. You would be wrong, as there are still lots of CW signals filling the bands.

There are a few trends in CW, though, because many still using this mode or learning it. You can also use the computer to send and receive CW. Taking advantage of technology for decoding CW, including multiple signals at one time with software like CW Skimmer
DX spots used to come via friends' phone calls or packet-based DX clusters. Today, most spots come via Internet-based sources. Many CW and digital spots are actually collected automatically by receivers with software-based decoding. The Reverse Beacon Network and PSK Reporter are two examples of these. For more on spotting and propagation visit www.k8zt.com/propagation.

Radios for HF (and in many cases UHF/VHF) have had a few big changes in the last ten years.

Software Defined Radios (SDR): Whether they are run through an attached computer interface as in the Flex series or built into a stand-alone radio with buttons and knobs, as with the extremely popular ICOM 7300, SDRs have drastically changed radio technology.
Many of today's transceivers feature multicolor LCD displays that include band scopes. Also known as spectrum scopes or waterfall displays, band scopes allow you to see signals on adjacent frequencies without moving your tuning knob.

Adjustable filtering is built into most new rigs. Previously there was a significant post-purchase cost associated

with adding additional filters to your new radio.
Built-in sound cards: As explained above, Digital Sound Card Modes have become very popular. Manufacturers have responded by installing a sound card in the radio. This allows easy access to these modes with a simple USB cable between the radio and your computer. This single USB cable has replaced the older RS-232 or proprietary interfacing cables required to connect your radio to your computer.
Most HF radios include 6M and some even have 2M and 70cm.
Some radios now have built-in CW and/or RTTY decoding.
DX Engineering has a wide variety of HF Radios, from budget-minded to full-featured. Below is a table comparing some of the most popular rigs.

As you get back on the air, it's important to have support and resources when learning how to operate new modes or new equipment. I suggest a multi-pronged approach:

Join your local GEARS meetings. You can meet Hams using the new modes and equipment, get advice on purchasing new equipment, and find Elmers who can help with station setup or operation. To locate a local group, you can search for ARRL-affiliated clubs here.

Join the ARRL, the national organization for Amateur Radio in the U.S. One recent change is that members now have access to all four of ARRL's major publications—QST Magazine, On the Air (publication for new Hams), QEX, and National Contest Journal. If you are interested in specific areas of Amateur Radio, consider joining a special interest club. There are groups for DXing, Contesting, VHF, QRP, and other branches of the hobby that can provide support for these activities.

Get in the know by plugging into Amateur Radio News—"Keeping Up with Amateur Radio News and Events."
On-air activities to try: New modes: FT8 and FT4 are good candidates, especially if you have a limited antenna. Try a contest: State QSO Parties are great low-key contests for newer contesters. This year there is also a composite competition, the State QSO Party Challenge.

Get on HF and try to work all 50 states and 100 DX countries, even if you already have your WAS and DXCC awards. The challenge of doing it again (especially on a new band or mode) can be invigorating! Read "Top Secret: Techniques for Working 50 States and 100 Countries" for a little encouragement and some tips.

Our last topic is QSLing. Traditionally, Hams have exchanged paper postcards acknowledging contacts with other stations. Many awards require these as proof for applicants. In the past, there were two ways to exchange cards—directly via mail or via the ARRL QSL Bureau. Logbook of The World (LoTW) from the ARRL is an online paperless QSLing system. Another system is eQSL. In addition, many DX stations are accepting a hybrid type of QSL exchange called OQRS. For more information on all of these QSLing changes and more, read "QSLing in an Online World."

From OnAllBands.com

The Hows and Whys of Operating on Two Meters or Six During the Summer Months
By Sean Kutzko, KX9X

Let's face it: The HF bands haven't been that great for a while.

Trying to enjoy Ham Radio during the bottom of the 11-year solar cycle can be tough. The maximum usable frequency (MUF) rarely gets above 14 MHz, meaning QSOs on 17, 15, 12, and 10 meters are hard to come by. And the summer months see an increase in noise on the HF bands, which only deepens the suffering.

However, for many Hams, the summer months are the most exciting time to be on the air. These are VHFers, Hams who enjoy making QSOs on 50 MHz and up. To them, mid-May to mid-August on the "ultra-highs" offers exciting propagation modes whose openings have nothing to do with the 11-year solar cycle. With a bit of change in perspective, you could be enjoying Ham Radio when others have pulled the big switch and found alternative things to do. And if you're a Technician, these tips can help you do more with your license, because you have full privileges on all frequencies above 50 MHz. Many Hams have HF all-mode radios that include 6 meters, and some of the "DC-to-daylight" rigs have 2 meters and 70 centimeters as well. If you haven't explored these

additional bands, you are leaving some QSOs on the table during a time of low sunspot activity!

There are three major forms of propagation that VHFers use to their advantage: sporadic-E, tropospheric ducting, and aurora. Here's a brief description of how these propagation modes work.

Sporadic- E
Sporadic-E, sometimes called E-skip, is so named because it occurs in the E-layer of the ionosphere, and because it's… well, sporadic. During the summer months, ionized particles in the E-layer can clump together, becoming dense enough to reflect radio signals back to earth. 10 meters sees quite a bit of sporadic-E activity in the summer months. However, when the clouds get dense enough, 6 meters will also open. On rare occasions, even 2 meters can be affected. QSOs from 800-1,000 miles are common on a single "hop." If two clouds appear at the same time and line up just right, "double-hop" QSOs are possible up to around 1,600 miles. Multi-hop openings to Europe and Central/South America occur on occasion. Lots of contacts can be made on SSB, CW, and FT8.

The downsides: First, because this is a naturally-occurring phenomenon, it's nearly impossible to predict when a sporadic-E opening will happen. It is possible to go weeks without hearing a signal, though that is a rare occurrence during the summer months. Second, the opening can be very selective. You may see 6 meters open, but Hams a hundred miles away may hear nothing but static.

Depending on the size, position and density of the ionized clouds, the areas you hear may be very selective. For example, you may only hear stations from a particular state. Other times, the band is wide open, and you will hear stations from an entire region of the country. Openings can last from just a few minutes to several hours, depending on the density of the ionized clouds. Check out this video of VE3EN in Ontario working a 6 meter pileup on sporadic-E.

Tropospheric Ducting
Tropospheric ducting, or tropo, openings occur during stable weather periods of high pressure. While tropo can occur any time of year, it is most common during the summer and autumn. Typical conditions are warm, cloudless days with little or no wind. If a large layer of cold air encounters a large body of warm air, a temperature inversion, or duct, can be created. If it occurs on a larger scale, 2 meter signals can travel hundreds of miles. In extreme cases, tropo openings can extend all the way up to 1.2 GHz. Here's a video of Larry, WD0AKX, talking us through a 2 meter FM tropo opening in Minnesota in 2015.

Aurora
HF operators cringe when they hear the words "solar flare" or "coronal mass ejection." They know that a large burst of charged particles is going to hit the ionosphere and disrupt their bands, oftentimes generating the Northern Lights. What many Hams don't know is that these flares can create fascinating opportunities for QSOs on 6 and 2 meters, and even 70 centimeters in extreme cases.

The key to working an aurora opening is to point your antenna to the north. The northern lights are an indicator as to how far the ionization is occurring at the poles; the larger the flare, the greater the disturbance, and the farther away from the poles aurora openings will occur. By pointing your antennas north, you are using the edge of the aurora as a reflector of your radio signal.

Here's the catch: the surface of the aurora isn't smooth. As a result, your transmitted signal hits the surface of the aurora and scatters in several directions simultaneously, more or less back toward you. This results in a very distorted signal. On 6 meters, you can usually understand an SSB signal enough to make a QSO. On 2 meters, the distortion is so severe that voice QSOs are impossible. CW is the most effective mode for aurora QSOs on 2 meters and up. Even then, the distortion is so pronounced that a pure CW tone, which normally sounds like a "BEEP," will be almost whisper-like, sounding more like a "PFFFT." However, openings of hundreds of miles are possible under these conditions.

Here's what 6 meter SSB sounds like on aurora (youtube.com), and here's what CW sounds like during a 2 meter aurora.

Equipment Needed
Most radios will have enough power to successfully make QSOs on the VHF+ bands during these types of openings. Sporadic-E QSOs can be made with very little transmit power, if the opening is strong. As far as antennas, while bigger is always better, smaller antennas can have excellent results during good openings. A dipole for 6 meters is only 9' 4" long; you can make it out of wire and hang it from a tree, or construct one using aluminum tubing, a mast plate and a feedpoint connector. Use hose clamps to tighten down the tubing, and adjust the length for best SWR. For domestic QSOs, a 6-meter antenna doesn't have to be very high; good results can be had with antennas only 15-20 feet above ground.

For tropo, strong openings can be worked on FM using a good vertical antenna. A small beam will do better, of course. Don't forget on the VHF+ bands, FM contacts use vertically-polarized antennas, while SSB and CW contacts use horizontally-polarized antennas. If you're using the incorrect polarization, received signals could be affected by as much as 20 dB.

For aurora openings, as you will be using either SSB or CW, use a horizontally-polarized beam pointed north.

How to Tell When the Bands Are Open
With these forms of propagation being intermittent, you need to pay a bit more attention to catch an opening. There are several ways to do this.

DXMaps has a series of maps for 6 and 2 meters showing QSOs made within the last hour. You can select maps by band and continent.
Tropo openings on 2 meters can be monitored at aprs.mennolink.org. The site uses APRS beacons to indicate probable tropo openings.
You can get a forecast of expected tropo conditions at www.dxinfocentre.com/tropo.
Auroral openings can be monitored at www.solarham.net. Keep an eye on this site whenever a solar flare or coronal mass ejection is taking place.
Both 6 and 2 meters have low-powered CW beacon stations that are active 24/7 and can be monitored to detect band openings. These beacons constantly repeat their callsign and grid in CW. 6 meter U.S. beacons are found between 50.050 and 50.080 MHz; 2 meter beacons are found between 144.270 and 144.300 MHz. A worldwide list of 6 meter beacons is found here; a list of U.S. 2 meter beacons can be found here.
You can also monitor the 6 meter and 2 meter calling frequencies for any openings.

6 Meter calling frequencies: SSB – 50.125 MHz. FM – 52.525 Mhz. FT8: 50.313 Mhz.

Note: between 50.100 and 50.125 MHZ is the 6 meter "DX Window," an area that is reserved for DX QSOs. Please do not make US to US QSOs in the DX window.

2 Meter calling frequencies: SSB/CW – 144.200 MHz; FM – 146.520 MHz.

Calling frequencies are places where people can call to make a QSO to see if the band is open. If a station calls on the calling frequency and gets a reply, move off the calling frequency to continue the QSO. It is bad practice to monopolize the calling frequency. To monitor, simply tune your radio to the desired frequency and engage your squelch just enough to silence the static. If the band opens, a signal will break the squelch; that means it's time to get on the radio!

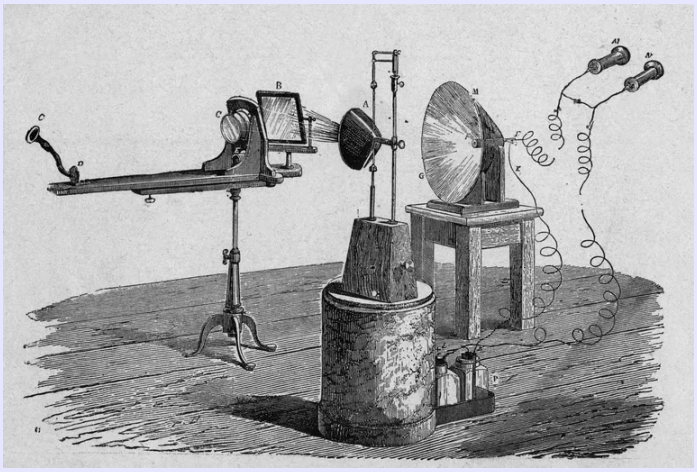
Try It – You'll Like It!
As you can see, there's a lot going on in the VHF portion of the band during the summer months! I encourage you to get an antenna and try making some QSOs on these bands; summertime doesn't have to be dead air time!
I hope to work you this season on 6 or 2 meters!

From onallbands.com

First Wireless Electronic Voice Communications, Twenty Years Before Radio

In 1880 just four years after he patented the telephone, Alexander Graham Bell was talking wirelessly.

The photophone receiver used a simple selenium cell photodetector at the focus of a parabolic mirror. The cell's electrical resistance (between about 100 and 300 ohms) varied inversely with the light falling upon it, i.e., its resistance was higher when dimly lit, lower when brightly lit. The selenium cell took the place of a carbon microphone—also a variable-resistance device—in the circuit of what was otherwise essentially an ordinary telephone, consisting of a battery, an electromagnetic earphone, and the variable resistance, all connected in series. The selenium modulated the current flowing through the circuit, and the current was converted back into variations of air pressure—sound—by the earphone.



On April 1, 1880, Washington, D.C., experiment, Bell and his assistant Charles Tainter communicated some 259 ft along an alleyway to the laboratory's rear window. Then a few months later on June 21 they succeeded in communicating clearly over a distance of some 700 ft., using plain sunlight as their light source, practical electrical lighting having only just been introduced to the U.S. by Edison. The transmitter in their latter experiments had sunlight reflected off the surface of a very thin mirror positioned at the end of a speaking tube; as words were spoken they cause the mirror to oscillate between convex and concave, altering the amount of light reflected from its surface to the receiver. Tainter, who was on the roof of the Franklin School, spoke to Bell, who was in his laboratory listening and who signaled back to Tainter by waving his hat vigorously from the window, as had been requested.

The receiver was a parabolic mirror with selenium cells at its focal point. Conducted from the roof of the Franklin School to Bell's laboratory at 1325 'L' Street, this was the world's first formal wireless telephone. Although Bell Telephone researchers made several modest incremental improvements on Bell and Tainter's design, Marconi's radio transmissions started to far surpass the maximum range of the photophone as early as 1897 and further development of the photophone was largely arrested until German-Austrian experiments began at the turn of the 20th century.

Bell's invention had a bit of a revival, as fiber optics revived light-transmitted telecommunication in the late 20th century. By 1980, the Smithsonian was dusting off the photophone that Bell had donated, to celebrate the centennial of an invention that lived up to its inventor's enthusiasm long after he had died.

Club Officers:

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